

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today
(1) was not written for publication in a law journal and
(2) is not binding precedent of the Board.

Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte TOM P.E. BROEKAERT

Appeal No. 1998-2934
Application No. 08/290,275

ON BRIEF

Before THOMAS, KRASS and RUGGIERO, Administrative Patent Judges.

KRASS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-4, all of the claims pending in the application.

The invention is directed to a resonant tunneling diode best illustrated by reference to representative independent claim 1, reproduced as follows:

1. A resonant tunneling diode, comprising:
 - (a) an emitter made of a first material;
 - (b) a first tunneling barrier made of a second material and abutting said emitter;
 - (c) a quantum well made of a third material and abutting said first tunneling barrier;
 - (d) a second tunneling barrier made of said second material and abutting said quantum well; and
 - (e) a collector made of a fourth material and abutting said second tunneling barrier;
 - (f) wherein said first material, said second material, said third material, and said fourth material are taken from the group of III-V semiconductors which contain nitrogen and lattice match silicon.

The examiner relies on the following reference:

Brown et al. [Brown]	5,583,351	Dec. 10, 1996 (Filed Apr. 21, 1994)
----------------------	-----------	--

The examiner also relies on appellant's admitted prior art [APA] presented in the background section of the specification.

Claims 1-4 stand rejected under 35 U.S.C. § 103 as unpatentable over APA in view of Brown.

Reference is made to the brief and answer for the respective positions of appellant and the examiner.

OPINION

We will reverse the rejection of claims 1-4 under 35 U.S.C. § 103 because, in our view, from the evidence of record, it does not appear that the examiner has established a prima facie case of obviousness with regard to the instant claims subject matter.

It is the examiner's view that APA discloses the subject matter of independent claims 1 and 3 but for the recited materials being "taken from the group of III-V semiconductors which contain nitrogen and lattice match silicon." Brown does disclose such materials. This much is undisputed by appellant.

The examiner reasons that it would have been obvious "to utilize other known semiconductor materials, such as group III-V nitride alloys for the known group III-V resonant tunneling diode of [APA] as suggested by Brown...since it was well known that the tunneling layer is made of narrow energy bandgap material and the quantum well is made of wide energy bandgap material" [answer-page 5].

In response to appellant's argument [brief-page 3] that Brown has no suggestion that the same materials could be used for the tunneling barriers of a resonant tunneling

diode because Brown uses carriers in the conduction and valence bands of the confinement barriers which recombine in the quantum well and emit light photons while a resonant tunneling diode has carriers of a single type which tunnel through the tunneling barriers and resonant with energy levels in the quantum well, the examiner explains that the tunneling phenomenon depends on the thickness of the tunneling barrier layer and the resonant phenomenon depends on the thickness of the quantum well and the barrier height [answer-page 7]. Therefore, if we understand the examiner correctly, the examiner is contending that whether there is tunneling, as in the instant invention, or confinement, as disclosed by Brown, is dependent on the thickness of both the tunneling barrier layer and the quantum well, both within the skill of the artisan to alter.

Even assuming, arguendo, that the examiner is correct in that assessment, the examiner still has presented no convincing line of reasoning as to why, from the evidence presented by APA and Brown, the skilled artisan would have been led to employ the materials disclosed by Brown in a resonant tunneling diode when Brown is completely silent as to any tunneling. As far as we can tell, from the evidence before us, the only suggestion for using materials taken from the groups of III-V semi-

Appeal No. 1998-2934
Application No. 08/290,275

conductors which contain nitrogen and lattice matched silicon in a resonant tunneling diode comes from appellant's disclosure and not from any prior art of record.

Accordingly, the examiner's decision rejecting claims 1-4 under 35 U.S.C. § 103 is reversed.

REVERSED

JAMES D. THOMAS)	
Administrative Patent Judge)	
)	
)	
)	BOARD OF PATENT
ERROL A. KRASS)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES
)	
)	
JOSEPH F. RUGGIERO)	
Administrative Patent Judge)	

eak/vsh

Appeal No. 1998-2934
Application No. 08/290,275

Carlton H. Hoel
Texas Instruments Patent Department
Mail Station 219
P.O. Box 655474
Dallas, TX 75265